

a multiplication and accumulation block for multiplying and adding the delay signal of the delay line block by the filter coefficient output by the filter coefficient table block to generate the echo-cancelled echo output signal.

26. (New) The echo canceller of claim 1, wherein the filter coefficient output by the filter coefficient table block has a shift rate equal to the ratio of the first data rate and the second data rate.

27. (New) The echo canceller of claim 1, wherein while operating in the central terminal (CO) mode the delay line block divides a line for inputting the input signal into eight delay lines to delay the input signal.

REMARKS

The Examiner's reconsideration of the rejections in view of the following remarks is respectfully requested.

Claims 1-15 are pending in the application.

Claims 1 -5 were rejected under 35 U.S.C. §102(e) as anticipated by Agrawal (US Pat. No. 4,268,727). The Examiner stated essentially that Agrawal teaches “an echo canceller for an asymmetric communication system” as claimed in claims 1-5.

Applicant respectfully disagrees. Agrawal explicitly teaches that “The interval T between x-words is the same as the interval between w-words. Thus, the sampling rate is (1/T).” (col. 9 lines 5-7) “Timing is conventional; and is not shown, however, timing may be provided either by an internal or external clock.” (col. 9 lines 53-55) The communication system and the echo canceller in Agrawal is symmetric, not *asymmetric*, and thus Agrawal teaches only processing the received data and the transmitted data at the

same “sampling rate $1/T$ ” to detect and remove an echo. The symmetrical echo canceller in Agrawal is incapable of being used as “an echo canceller for an *asymmetric* communication system”, and no “intention” to use such an incapable symmetrical echo canceller in such an incompatible asymmetrical system can be inferred.

Because Agrawal does not disclose nor suggest an “*asymmetric* communication system, Agrawal does not disclose “an echo canceller for an *asymmetric* communication system”.

Further, Agrawal does not teach nor suggest a delay line block including “a plurality m of delay lines used in central office (CO) mode for delaying the input signal for a predetermined interval to generate a delay signal, wherein fewer than m among the m delay lines are used for delaying the input signal while the echo canceller operates in a remote terminal (RT) mode” as claimed in dependent claim 26.

Nor does Agrawal teach or suggest that the same “shift register is used while the echo canceller operates in the central office (CO) mode and while the echo canceller operates in the remote terminal (RT) mode” as claimed in dependent claim 3. Similarly, Ide (US Pat. No 5,841,856) does not teach nor suggest a “shift register” for storing filter coefficients let alone that the same “shift register is used while the echo canceller operates in the central office (CO) mode and while the echo canceller operates in the remote terminal (RT) mode” as claimed in dependent claim 3. Similarly, Ide (US Pat. No 5,841,856) does not teach nor suggest a filter “coefficient output by the filter coefficient table block has a shift rate” as claimed in dependent claim 4. The Ide patent does not even contain the words “shift” nor “register”, and merely refers to fixed

“predetermined coefficients” corresponding to the “plurality of multipliers 82-1, 82-2...” (col 3. lines 30-31) without suggesting that they are stored in or derived from a “shift” register or a “filter coefficient table block”. Even if the telephone set of Ide was misconstrued as having both a “central office (CO) mode” in addition to its “remote terminal (RT) mode”, the telephone set of Ide comprises two distinct “FIR filters”, one for transmitting and one for receiving, thus teaching away from the shared-use of hardware principle of the invention as claimed:

“The hands-free telephone set 20 further comprises a reception speaker 1 for converting an electrical signal corresponding to a reception signal into speech, and outputting it, a transmission microphone 2 for converting transmission speech into an electrical signal and inputting it, an echo canceler 6 inserted in a reception path 12 to cancel line echoes generated on the line side, and an echo canceler 3 inserted in a transmission path 13 to cancel acoustic echoes generated when reception speech output from the reception speaker 1 leaks to the transmission microphone 2.

Ide, col. 2 lines 49-58 [and also col 2. lines 59-65]

Further, neither Agrawal, (US Pat. No. 4,268,727) nor Ide, nor their combination teaches “wherein the filter coefficient output by the filter coefficient table block has a shift rate equal to the ratio of the first data rate and the second data rate” as claimed in claim 4 (and in new dependent claim 28). In exemplary embodiments of the present invention, “The filter coefficient has a shift rate of 1:4 that is a ratio of the RT mode [data rate] to the CO mode [data rate] in an asymmetric [ADSL] communication system.” Application page 13.

Accordingly, neither Agrawal, (US Pat. No. 4,268,727) nor Ide, nor their combination teaches all the limitations of claims 1-5 as required by 35 USC 102(e) and

103, and therefore claims 1-5 and 26-28 are believed to be allowable. The Examiner's reconsideration of the rejections of claims 1-5, is respectfully requested.

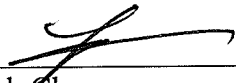
Further, neither Agrawal, (US Pat. No. 4,268,727) nor Ide, nor their combination teaches an "echo canceller, for an asymmetric communication system having a downstream data rate and an upstream data rate different from the downstream data rate" as claimed in new claims 18-23. Further, neither Agrawal, (US Pat. No. 4,268,727) nor Ide, nor their combination teaches an "echo canceller for generating an echo-cancelled output signal in an asymmetric communication system configured to download an input data signal at a first data rate and to upload an output data signal at a second data rate different from the first data rate" as claimed in new claims 24-25.

Thus, it is believed that the independent claims 1, 18, and 24 and dependent claims 2-5, 19-23, 25, and 26-28 are allowable.

For the forgoing reasons, the application is believed to be in condition for allowance. Early and favorable reconsideration of the case is respectfully requested.

Respectfully submitted,

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